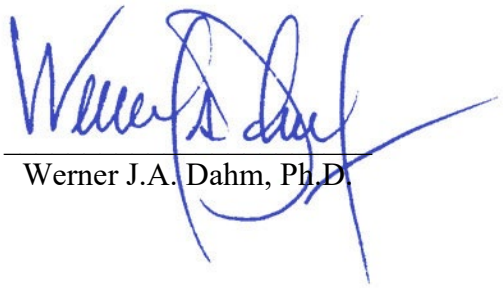
IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

MIDAS GREEN TECHNOLOGIES, LLC, Plaintiff, v. GREEN REVOLUTION COOLING, INC., Defendant.	§ § § § § § § § § § §	CIVIL ACTION NO. 6:24-CV-166-ADA

DECLARATION OF WERNER J.A. DAHM, Ph.D.
IN SUPPORT OF DEFENDANT'S CLAIM CONSTRUCTIONS

Submitted on November 25, 2024



Werner J.A. Dahm, Ph.D.

Contents

I. INTRODUCTION

1. I, Werner J.A. Dahm, Ph.D., have been retained by Greenberg Traurig, LLP on behalf of Defendant Green Revolution Cooling, Inc. ("GRC") as a technical expert in this matter. I understand that Plaintiff Midas Green Technologies, LLC (collectively, "Midas" or "Plaintiffs") have accused GRC of infringing claims 1-3 and 6 of U.S. Patent No. 10,405,457 (the "'457 patent").

2. I have been asked to explain certain aspects of the technology that are relevant to understanding the patent-in-suit. Specifically, I have been asked to consider and render my opinion on the meaning of the phrase "the tank and primary circulation facility comprise a highly-integrated module" in claim 2 of the '457 patent.

3. The opinions expressed in this Declaration are my own. Unless otherwise stated, I have personal knowledge of the facts stated in this Declaration. This Declaration is subject to amendment and/or supplementation on the basis of information that may be made available to me in the future. I reserve the right to submit additional materials related to my opinions about the constructions of the claim terms at issue in this case, including without limitation, a declaration in support of any subsequent claim construction brief filed by GRC and/or a declaration responding to any expert testimony submitted by Midas. I also reserve the right to submit additional expert reports in this matter in accordance with the case schedule.

II. PERSONAL BACKGROUND

4. I have 46 years of experience in mechanical and aerospace engineering, including as a practicing engineer in industry, as an engineering professor, as an engineering consultant to industry, and as an engineering consultant to national laboratories and to the U.S. Government.

5. I hold a B.S.E. degree in Mechanical Engineering from the University of Alabama in Huntsville, awarded in 1978, an M.S. degree in Mechanical Engineering from the University of Tennessee, awarded in 1981, and a Ph.D. degree from the Division of Engineering and Applied Science at the California Institute of Technology (Caltech), awarded in 1985.

6. The graduate courses and research that led to my M.S. and Ph.D. degrees were focused almost entirely on subjects dealing with fluid dynamics, thermodynamics, heat

transfer, thermal sciences, and related areas. These included courses on the theoretical aspects of these subjects as well as their practical implementation in engineered systems. Additionally, my doctoral dissertation at Caltech was on the fluid dynamics associated with mixing in a liquid system, and my doctoral research involved designing, building, and operating a liquid circulation tank in which I conducted experiments on mixing in a liquid system.

7. I am the ASU Foundation Professor of Mechanical and Aerospace Engineering in the Ira A. Fulton Schools of Engineering at Arizona State University (ASU) and am also Professor Emeritus of Aerospace Engineering at the University of Michigan. Foundation Professorships at ASU are endowed and chaired positions awarded by ASU, the largest single university in the U.S., to an exceedingly small number of its faculty members in recognition of exceptional technical and professional accomplishments. I have served on the Mechanical and Aerospace Engineering faculty at ASU for the past 14 years, and previously served for 25 years as a Professor of Aerospace Engineering at the University of Michigan, where I continue to serve as Professor Emeritus.

8. The fields of mechanical and aerospace engineering are closely related, and both are based on the same major technical areas. Whereas mechanical engineering generally focuses on applying these technical areas – which include the areas in which I specialize, namely fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas, including their utilization in a wide range of applications – toward designs for lower-cost production and maintenance, aerospace engineering generally focuses on applying these technical disciplines toward designs for higher performance, lower weight and volume, and more extreme environments.

9. The main technical areas involved in this litigation, including fluid dynamics, thermodynamics, heat transfer, thermal sciences, and related areas, are taught to students of both mechanical and aerospace engineering. At most universities, mechanical and aerospace engineering are grouped together in a single "Mechanical and Aerospace Engineering" program, as they are at ASU.

10. In the nearly 40 years that I have served on the engineering faculty of the University of Michigan and Arizona State University, I have performed extensive teaching and research on various subjects that relate to fluid dynamics, thermodynamics, combustion, heat transfer,

thermal sciences, and related areas, including their utilization in a wide range of applications. I have taught aspects of these subjects to over 5,000 engineering students ranging from undergraduates to M.S. and Ph.D. students, and I have guided the doctoral dissertation research of more than two dozen Ph.D. recipients in various aspects of these subjects. I have also conducted research on various aspects of these subjects that has been published widely in leading national and international archival technical journals in these fields.

11. I am an author of over 200 refereed technical articles, conference papers, and technical publications in my fields of specialization, I hold six U.S. and international patents, and have given over 260 technical presentations, including more than 190 invited, plenary, and keynote lectures worldwide on topics dealing with fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas, including their utilization in a wide range of mechanical, aerospace, and other industrial applications, and broadly with mechanical and aerospace engineering.

12. I have also served extensively as a reviewer of technical papers, books, and research proposals related to my areas of expertise, as an organizer and advisor for national and international conferences in my technical field of specialization, as an invited and plenary speaker at numerous technical conferences in my fields, and as an invited speaker on these subjects at leading universities and research organizations in my technical field throughout the world.

13. In my research work over the past 43 years – initially at Caltech, then at the University of Michigan, and then at Arizona State University – I have conceived, designed, built, and operated numerous fluid circulation systems involving the application of fluid dynamics and heat transfer principles. These include liquid tanks for liquid circulation, some of which also involved filtration of the fluid.

14. I am a member and Fellow of the American Physical Society (APS) in the Division of Fluid Dynamics (DFD), a member and Fellow of the American Institute of Aeronautics and Astronautics (AIAA), and a member of the American Society of Mechanical Engineers (ASME). These are all leading professional technical societies in fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas, including their utilization in a wide range of applications. Elevation to Fellow is an honor bestowed on less

than one percent of the active membership of these professional organizations in recognition of exceptional technical accomplishments.

15. I have received numerous other honors and awards for my work in fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas, including the 2023 AIAA Fluid Dynamics Best Paper Award, the 1938E Distinguished Achievement Award from the University of Michigan, the George J. Huebner Research Excellence Award from The University of Michigan, and the William F. Ballhaus Prize from Caltech.

16. I have previously served as an Associate Editor for the AIAA Journal and in leadership roles in major professional technical societies associated with my technical fields, including on the APS/DFD Executive Committee, the AIAA Publications Committee, and others.

17. Due to my expertise in fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas, from 2006 to 2021 I was asked to serve as a member of the highly prestigious U.S. Air Force Scientific Advisory Board (SAB), including as the Chairman of the Board from 2014-2017 and as a member of the SAB Executive Committee. In recognition of my technical accomplishments on the U.S. Air Force Scientific Advisory Board, in 2018 I was awarded the Secretary of the Air Force Distinguished Public Service Award – the highest honor the Air Force can bestow on a non-employee civilian.

18. In part as a result of my technical accomplishments on the U.S. Air Force SAB and my expertise in fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas, in 2008 I was asked by the Chief of Staff of the U.S. Air Force to take a temporary leave of absence from the University of Michigan to serve as the Chief Scientist of the U.S. Air Force within Headquarters Air Force in the Pentagon. I accepted this highly prestigious full-time position, at the civilian-equivalent rank of a three-star general, as the direct science and technology advisor to the Secretary of the Air Force and the four-star Air Force Chief of Staff. In recognition of my technical contributions and accomplishments as the Chief Scientist of the U.S. Air Force, in 2010 the Secretary of the Air Force awarded me the Air Force Decoration for Exceptional Civilian Service – the highest honor the U.S. Air Force can bestow on a civilian employee of the Air Force.

19. I have also served on technical advisory boards for NASA and Lawrence Livermore National Laboratory, and in numerous other technology advisory and technical review roles for various organizations and companies. These roles all involved, in part, matters pertaining to fluid dynamics, thermodynamics, combustion, heat transfer, thermal sciences, and related areas in various engineered systems. I have also served extensively on technical advisory and organizational committees for numerous technical conferences in my fields, and as a consultant for industry in these fields.

20. Attached as Appendix A is my curriculum vitae, which includes a more detailed statement of my professional qualifications, including education, publications, honors and awards, professional activities, consulting engagements, and other relevant experience.

III. OVERVIEW OF MATERIALS CONSIDERED

21. In reaching the opinions expressed in this Declaration, I have reviewed and considered the materials cited in this Declaration, including the patent-in-suit as well as its file history.

IV. LEGAL PRINCIPLES

22. I understand that in assessing how a person of ordinary skill in the art (a "POSITA") would understand a claim term, one must consider the claim language, the rest of the patent's specification, and the patent's prosecution history (sometimes alternatively called the "file history"), which are collectively called the "intrinsic evidence."

23. I understand that, based on the intrinsic evidence (i.e., the claim language, the rest of the specification, and the prosecution history of the patent), one attempts to determine how a person of ordinary skill would understand any given term in the context of the patent. I also understand that the context provided by the intrinsic evidence is very important, and that considering how a person of ordinary skill would understand a term outside of that context is of at most secondary importance, or even improper.

24. I understand that in assessing how a person of ordinary skill in the art would understand a claim term, it is permissible, and sometimes helpful, to consult other evidence that is not part of the "intrinsic evidence," such as expert and inventor testimony, dictionary definitions and technical treatises. I understand that this type of evidence is called "extrinsic

evidence." However, I understand that this should be done only when the meaning of a patent term is unclear from the intrinsic evidence.

25. I understand that the plain and ordinary meaning of a claim term is the meaning that the term would have to a person of ordinary skill in the relevant art as of the effective filing date of the patent application.

26. I understand that a patent applicant may serve as his or her own lexicographer. In doing so, the applicant may rebut the presumption that the plain and ordinary meaning applies to claim terms if the applicant explicitly provides his or her own unique definition separate and apart from the plain and ordinary meaning. If the applicant explicitly defines a claim term, the applicant's definition will be controlling for that term. I also understand that, when a patent applicant chooses to act as his or her own lexicographer, the use of that claim term in the larger context of the specification may further inform the meaning of the term.

27. I understand that if a claim term fails to inform a person of ordinary skill in the art with reasonable certainty as to the scope of the invention, the claim term is indefinite under 35 U.S.C. § 112. I understand that any such determination of whether a claim term is indefinite should be made by viewing the claim term in light of the specification and the prosecution history.

V. LEVEL OF ORDINARY SKILL IN THE ART

28. I understand that my assessment of the claims of the '457 patent must be undertaken from the perspective of what would have been known or understood by a person having ordinary skill in the art, reading the '457 patent on its earliest effective filing date, which I understand is sometimes referred to as the "priority date," and in light of the specification and file history of the '457 patent. I will refer to such a person as a "POSITA."

29. I understand that my analysis and opinions expressed in this declaration must be rendered based on the perspective of a POSITA as of the priority date of the '457 patent. I also understand that a POSITA is a hypothetical person who is presumed to know the relevant art as of the earliest effective filing date of the alleged invention claimed in the '457 patent.

30. I understand that, to determine the appropriate level of a person of ordinary skill in the art, I am to consider factors including:

- the educational level and experience of active workers in the field,
- the type of problems encountered in the art or field of invention,
- the nature of prior art solutions to those problems,
- sophistication of the technology, and
- the rapidity with which innovations are made.

31. I have been instructed to assume a person of ordinary skill in the art is not a specific real individual, but rather a hypothetical individual having the qualities reflected by the factors discussed above.

32. I understand that a POSITA is a person of ordinary creativity, but not an automaton, and that a POSITA can often fit multiple patents or prior art references together like pieces of a puzzle as a result of this ordinary creativity. I also understand that I may consider the inferences and creative steps that a POSITA would employ. In addition, I understand that a POSITA would necessarily have been capable of understanding the scientific and engineering principles applicable to the pertinent art. I also understand that when I consider what would have been obvious to a POSITA, I am not considering what would have been obvious to me at the time, nor to the inventors, judges, laymen, those skilled in other arts, or to geniuses in the art.

33. Based on my review and analysis of the ’457 patent and the factors listed above, a POSITA in the field of the ’457 patent at the assumed earliest effective filing date (December 14, 2012) would have had a Bachelor of Science degree in mechanical or chemical engineering and at least two years of experience relating to the design and/or implementation of fluid circulation systems involving application of fluid dynamics and heat transfer principles. Additional education may serve as a substitute for a lack of experience and vice versa.

34. Fluid dynamics is the technical branch of engineering and science that deals with how fluids (gases, liquids) move under the effects of various driving forces, geometric constraints, etc. This includes understanding of flows where the resulting fluid inertia is large compared to the fluid viscosity[1]. These flow phenomena cannot always be seen, particularly

[1] In the field of fluid dynamics this is technically referred to as “high Reynolds number flow”.

where the fluid is transparent, but they have a profound effect on the convective heat transfer that the circulation of fluid produces.

35. Heat transfer is the technical branch of engineering and science that deals with thermal energy transfer by conduction, convection, and radiation, where *convection* refers to enhancement of heat transfer that results from fluid motion.

36. My opinion relies on various factors. For example, the "Field" of the '457 patent indicates that the patent "relates generally to electrical appliance cooling systems, and, in particular, to an improved appliance immersion cooling system and method of operation." ('457 patent at 1:21-24.) People working in this field usually had a mechanical or chemical engineering degree, as I note above, and ordinary skill would require at least two years of experience relating to the design and/or implementation of fluid circulation systems involving application of fluid dynamics and heat transfer principles.

37. Likewise, the "Background" section describes a problem that the '457 patent purports to solve – difficulty and disruption to server operation when draining cooling fluid. (*Id.* at 1:62-2:6.) The "Background" states:

> One particular problem in the vertical-stack-type systems disclosed in the above references is the necessity of draining the cooling fluid whenever physical access to the electronic modules was required. In general, such an operation, besides being time consuming, requires the entire system to be switched off, especially if the component requiring attention is an essential element in the system architecture, such as the central processing unit ("CPU"). One possible solution to this problem is to immerse circuit assemblies vertically into a tank containing the cooling fluid such that each of the various assemblies can be withdrawn independently from the tank for servicing, replacement, upgrade, etc.

(Ex-1001 at 1:62-2:6.) The '457 patent also describes several prior art systems. (*Id.* at 1:33-61, 2:1-22.)

38. Additionally, the '457 patent explains that "the key concept here is to move the secondary fluid to the point of heat exchange with the primary fluid, rather than to move the primary fluid to the point of heat exchange with the secondary fluid," to minimize "the total volume of the dielectric fluid circulating throughout each immersion module." (*Id.* at 8:47-

55.) A POSITA would have been familiar with the underlying technical concepts related to this background information.

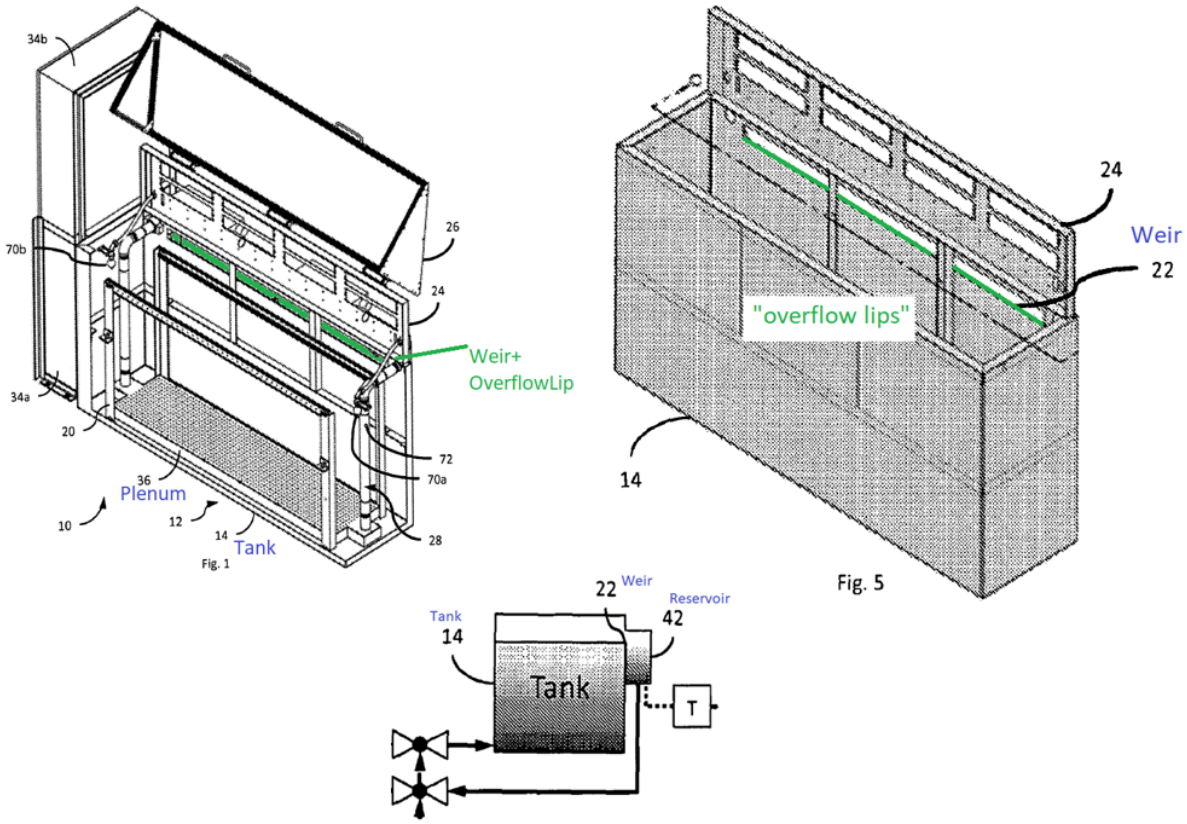
39. The educational level of active workers in the field of the invention also informs my opinion. Such individuals usually had at least a Bachelor of Science degree in mechanical or chemical engineering and at least two years of experience relating to the design and/or implementation of fluid circulation systems involving application of fluid dynamics and heat transfer principles.

40. As of December 14, 2012, I had more than ordinary skill in the art. I am, however, familiar with the skills and knowledge possessed by those I would have considered to be of ordinary skill in the art as of that date. When I refer to the understanding of a POSITA, I am referring to the understanding of such a person as of December 14, 2012, because I have been instructed to assume that the effective filing date is the filing date of the first provisional application to which the '457 patent claims priority (U.S. application no. 61/737,200). My opinions would not change, however, if the effective filing date of the '457 patent is determined to be a later date, such as the filing date of the second provisional application to which the '457 patent claims priority (U.S. application no. 61/832,211), i.e., June 7, 2013, or the filing date of the PCT application to which the '457 patent claims priority, i.e., December 13, 2013.

VI. THE '457 PATENT

41. The '457 patent concerns cooling systems for electrical appliances, namely immersion cooling systems which can include a tank, plenum, weir with an overflow lip, and an external reservoir to capture coolant flowing out of the weir. (Ex-1001 at 1:21-24, 3:39-56; 4:15-17, 4:27-32, FIGS. 1, 3, 5, 13.) The captured coolant is recycled back to the tank via the plenum after it is cooled in heat exchangers in a "primary circulation facility." (*Id.* at 4:27-32, 4:50-62.)

42. The '457 patent includes several figures illustrating its subject matter, for example:



(*Id.* at FIGS. 1, 5, 13.)

VII. THE "HIGHLY-INTEGRATED" PHRASE (CLAIM 2)

43. GRC proposes that the term "the tank and primary circulation facility comprise a highly-integrated module" in claim 2 is indefinite while Plaintiff contends that the term has its plain meaning.

44. I agree with GRC because this phrase, read in light of the patent's specification and prosecution history, fails to inform with reasonable certainty those skilled in the art as to the scope of the alleged invention of claim 2.

45. Claim 2 depends from claim 1. Both are reproduced here:

> 1. An appliance immersion cooling system comprising:
>
> *a tank* adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, *the tank comprising*:

a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot; and;

a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir;

a primary circulation facility adapted to circulate the dielectric fluid through the tank, *comprising*:

a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot;

a secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted; and

a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank.

2. The system of claim 1 wherein ***the tank and primary circulation facility comprise a highly-integrated module***.

('457 patent at claims 1-2 (emphasis added).)

46. As shown above, claim 2 requires that the "tank" and "primary circulation facility" (which comprises at least "a plenum, positioned *adjacent* the bottom of the tank") comprise a "highly-integrated" module. (*See* '457 patent at claim 7 (emphasis added).) Although claim 1 requires the tank and plenum be adjacent one another, there is no guidance in claims 1-2 (or any other claims) that help a POSITA determine when the tank and primary circulation facility comprise a "highly-integrated" module.

47. The term "highly-integrated" in claim 2 is a subjective term of degree: whether a particular arrangement satisfies claim 2 depends on whether a POSITA believes the tank and primary circulation facility are positioned sufficiently close together or packed sufficiently tightly to constitute a "highly-integrated" module versus an "integrated" module versus simply a "module." I understand that a patent's specification is supposed to provide some type of objective criteria that a POSITA can use as a guide for evaluating subjective terms of degree.

48. In the case of the '457 patent, the specification does not provide such objective criteria. More particularly, the specification states:

> Thus, in our preferred embodiment, all of the essential components of the primary circulation facility 28 are *tightly co-located* within the tank 14 so as to form a *highly-integrated* module.

('457 patent at 8:54-57 (emphasis added))

49. Other than in the claims that contain the disputed phrase (claims 2 and 7), the excerpt above is the only passage in the '457 patent that uses the term "highly-integrated." Likewise, the above excerpt is the only place where the related term "tightly co-located" is used.

50. Relatedly, the specification uses the term "integrated" on its own numerous times, including in the independent claims. (*See, e.g.*, '457 patent at 3:3, 3:53, 9:38, 10:21, 10:66.) The separate and distinct use of "integrated" and "highly-integrated" in the specification tells a POSITA that the terms mean different things, because the patentee used those different terms and therefore must have intended them to have different meanings, but again there is no other guidance in the specification to help a POSITA differentiate between, for example, "integrated" components and "highly-integrated" components.

51. Likewise, based on my 45 years of experience as an engineer, the term "highly-integrated" has no clearly defined meaning that is understandably distinct from the meaning of the term "integrated." For example, in my 45 years of experience as an engineer, I do not recall "highly-integrated" ever being a typical or commonly-used term in the context in which those terms are used in the '457 patent that would have an objective, reasonably certain scope. In other words, there is not some special meaning of the phrase "highly-integrated" that would be known to those working in the field of the '457 patent (namely in the context of mechanical and/or fluid systems).

52. I have also reviewed the prosecution history of the '457 patent. I note in the prosecution history that in an Office Action dated 4 Nov 2016 the Examiner rejected claims 2 and 7 of the application that led to the '457 patent, on grounds that:

> The term 'tightly co-located' is not sufficiently understood, or specifically defined by the specification, for its metes and bounds to be definite.

(Ex. 4[2].)

53. Later remarks (dated 31 Jan 2017) show that claims 2 and 7 were amended to replace "tightly co-located" with "highly integrated." (Ex. 5 at 2, 4.) The applicant stated:

> As explained in paragraph [0044], the Applicants intend the term "*tightly co-located*" to characterize the essential components of the primary circulation facility 28 as being *physically located sufficiently close* to the tank 14 "so as to form a *highly-integrated* module", see, lines 6-8. As noted in lines 3-6, the principle [sic] purpose in so arranging these components is to "move the secondary fluid to the point of heat exchange with the primary fluid, rather than to move the primary fluid to the point of exchange with the secondary fluid." As noted, "[i]n addition to conserving valuable floor space in a typical data center installation, the resulting modular configuration facilitates both easy initial installation and subsequent upgrade to efficiently satisfy increasing data center workloads", see, lines 14-17. In view of these details and the example configuration set forth in the drawings, Applicants respectfully submit that the term "*tightly co-located*" is sufficiently well defined to satisfy the requirements of 35 USC § l 12(b). Notwithstanding, in an effort to reduce issues, *Applicants have amended claims 2 and 7 to replace the term "tightly co-located" with the term "highly-integrated", an alternative term used in the specification to describe this physical arrangement*.

(Ex. 5 at 6 (emphasis added))

54. As the emphasis above indicates, the applicant correlated three subjective terms of degree with one another: "tightly co-located," "physically located sufficiently close," and "highly-integrated." This is no help to a POSITA. As I noted above, claim 1 requires a tank and plenum that are adjacent one another, while claim 2 further requires that the tank and primary circulation facility (of which the plenum is a part) be "highly-integrated." The fact that this term relates to sufficient physical closeness does not provide any objective criteria for a POSITA to evaluate closeness—whether "close" is "sufficiently close" is as ambiguous to a POSITA as whether "tight" is "tightly co-located" and "integrated" is "highly-integrated."

55. In a 17 May 2017 Office Action, the Examiner again rejected claims 2 and 7 in view of Applicants above-noted remarks, on grounds that "Best [2008] further teaches that:

[2] Unless otherwise noted, citations to an exhibit ("Ex.") are to the exhibit attached to the Declaration of Ashley Moore filed concurrently herewith.

> [T]he tank and primary circulation facility comprise a highly integrated module (the devices are all inherently physically connected to one another and located in the same facility; see also Figs. 1 B or 11), as per claims 2 and 7[.]

(Ex. 6 at 4; *see also* Ex. 7 at 5.)

56. The examiner's grounds for rejecting claims 2 and 7 in the Office Actions dated 17 May 2017 and 11 June 2018 seem to suggest he viewed "a highly-integrated module" to mean the tank and primary circulation facility are physically connected to one another and located in the same facility. As above, this does not provide a POSITA with any semblance of an objective standard to use when evaluating claim 2. Indeed, as I noted above, the tank and plenum must be adjacent one another in claim 1, so the fact that they may be located in the same facility could never reasonably be understood to mean that they are "highly-integrated." The examiner also did not in any way whatsoever address the distinction between "integrated" and "highly-integrated" in the context of the '457 patent. Thus, it is my opinion that the Examiner's remarks in the Office Actions dated 17 May 2017 and 11 June 2018 do not provide any usable insights into the '457 patent's intended meaning for its use in claims 2 and 7 of the term "highly-integrated."

57. Finally, on 6 July 2017, the Examiner introduced a new asserted prior art combination involving JP 5956100 B1. (Ex. 8.) However, that Japanese reference is dated July 2016, and therefore was not prior art.

58. This was pointed out to the examiner in an interview on 28 June 2017. (Ex. 9.) The examiner's reason(s) – if any – for thereupon allowing claims 2 and 7 appear to be related in some way to the examiner's error in asserting that the Japanese reference (JP 5956100 B1) was prior art. Because (1) the file history indicates that the examiner's error was first brought to his attention in the Applicant Interview on 28 June 2017, (2) there is no record of the details of the discussion between the examiner and applicants during that interview (beyond a high-level topic summary), and (3) the examiner suddenly thereafter allowed all of the claims upon his acknowledgement of his error in incorrectly asserting the Japanese reference as prior art, for at least those reasons the '457 patent's prosecution history in fact does not provide any useful clarity as to:

(a) what Applicants intended to be the meaning of "highly-integrated" in their claim term "a highly-integrated module" in claims 2 and 7, and

(b) what meaning the Examiner accepted – if any at all – for "highly-integrated" in allowing all of claims 1-16, including claims 2 and 7.

59. Therefore, it is my opinion that the prosecution history of the '457 patent does not address the lack of objective criteria in the claims and specification – a POSITA upon studying even the '457 prosecution history still would not have reasonable certainty as to the scope of the patentee's meaning for "highly-integrated" in the context of the '457 patent.

60. Thus, the '457 patent fails to inform a POSITA with reasonable certainty as to the scope of the invention of claim 2. Accordingly, I agree that the phrase "the tank and primary circulation facility comprise a highly-integrated module" is indefinite.

VIII. ADDITIONAL STATEMENTS

61. It is my understanding that discovery in this action is still ongoing. As such, I reserve the right to revise and/or supplement the opinions expressed in this Declaration in light of new information or allegations disclosed by, or on behalf of, Plaintiff. I further reserve the right to rely on and utilize visual aids, demonstratives, and the like to illustrate and support my opinions.

62. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 28 U.S.C. § 1001.